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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/853,190	05/11/2001	Tawassul A. Khan		6162
7590	07/31/2002			
EXAMINER				
LE, TOAN M				
		ART UNIT	PAPER NUMBER	
		2862		

DATE MAILED: 07/31/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/853,190	KHAN, TAWASSUL A.
Examiner	Art Unit	
Toan M Le	2862	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 11 May 2001.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) 9 is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-8 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some * c) None of:
1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) The translation of the foreign language provisional application has been received.
- 15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

This application contains claims directed to the following patentably distinct species of the claimed invention: 1-9.

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, claims 1-8 are generic.

I. **Claims 1-8** cite a method for determining in-situ bulk tortuosity of the interconnected pores of the reservoir rock, and estimating the bulk permeability of a reservoir of a reservoir formation connected between two wells.

II. **Claim 9** cites a method for determining in-situ bulk tortuosity of the interconnected pores of the reservoir rock, and estimating the bulk permeability of a reservoir of a reservoir formation in a well between two depth points in that well.

Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable thereon, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

Applicant is advised that the reply to this requirement to be complete must include an election of the invention to be examined even though the requirement be traversed (37 CFR 1.143).

During a telephone conversation with Sofia McGuire on 7/23/02 a provisional election was made without traverse to prosecute the invention of I, claims 1-8. Affirmation of this election must be made by applicant in replying to this Office action. **Claim 9** is withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-4 and 8 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-9 of U.S. Patent No. 6,175,536. Although the conflicting claims are not identical, they are not patentably distinct from each other because it would have been obvious to one having ordinary skill in the art at the time the invention was made to have used the method described in the U.S. Patent No. 6,175,536.

Referring to claim 1, '536 in claims 1 and 2 discloses a method for determining the presence of the Drag-Wave by determining the presence of the frequency side lobes of the Primary seismic wave.

As to claim 2, '536 in claims 1 and 2 discloses a method for determining the frequency of the side lobes in the frequency spectrum of the received signals.

Referring to claim 3, '536 in claim 3 discloses a method for using the determined side lobe frequencies to calculate the Drag-Wave frequency.

As to claim 4, '536 in claims 1 and 2 discloses a method for determining the Compressional Wave velocity of the rock formation between the two wells.

Referring to claim 8, '536 in claim 3 discloses a method for determining the relative amplitude of the Primary input frequency side lobes in relation to the amplitude of the Primary frequency as received and recorded in the receiver well.

Claim 5 is rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-9 of U.S. Patent No. 6,175,536 in view of Chon et al.

Referring to claim 5, Khan does not disclose a method for determining properties of a reservoir formation connected between two wells by analyzing the seismic signal transmitted into the formation from within one wellbore and received in another wellbore, the seismic signals including selected discrete frequencies comprising using the value of the Primary wave input frequency and the calculated Drag-Wave frequency along with the calculated Compressional Wave velocity of the rock formation between the two wells, the Drag-Wave velocity in the formation between the two wells can be calculated.

Chon et al. discloses a method for determining properties of a reservoir formation connected between two wells by analyzing the seismic signal transmitted into the formation from within one wellbore and received in another wellbore, the seismic signals including selected discrete frequencies comprising using the value of the Primary wave input frequency and the calculated Drag-Wave frequency along with the calculated Compressional Wave velocity of the rock formation between the two wells, the Drag-Wave velocity in the formation between the two wells can be calculated (col. 6, lines 19-31).

Accordingly, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have applied the method for calculating the Drag-Wave velocity

as described in the Chon et al. reference into the method of Khan to have a more accurate mapping permeable reservoir formations.

Claim 6 is rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-9 of U.S. Patent No. 6,175,536 in view of Stearns.

Referring to claim 6, Khan does not disclose a method for determining the bulk tortuosity of the in-situ reservoir formation between the two source and receiver wells based on the calculated Drag-Wave velocity and the compressional velocity of the pore fluids derived from the well logs and the fluid samples from the wells.

Stearns discloses a method for determining the bulk tortuosity based on the calculated Drag-Wave velocity and the compressional velocity (col. 2, lines 59-63; col. 3, lines 61-65; col. 4, lines 7-18; equation # 3).

Accordingly, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have applied the method for determining the bulk tortuosity as described in the Stearns reference into the method of Khan to have a more accurate mapping permeable reservoir formations.

Claim 7 is rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-9 of U.S. Patent No. 6,175,536 in view of Liu et al..

Referring to claim 7, Khan does not disclose a method for estimating the bulk permeability of the in-situ reservoir rock formation connected between the two wells based on the calculated value of the tortuosity and the value of porosity and average pore radius derived from the well logs and the core samples of the reservoir rock.

Liu et al. discloses a method for estimating the bulk permeability of the in-situ reservoir rock formation connected between the two wells based on the calculated value of the tortuosity and the value of porosity and average pore radius derived from the well logs and the core samples of the reservoir rock (col. 15, lines 37-60).

Accordingly, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have applied the method for estimating the bulk permeability of the in-situ reservoir rock formation as described in the Liu et al. reference into the method of Khan to have a more accurate mapping permeable reservoir formations.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

Claims 1-5 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Chon et al..

Referring to claim 1, Chon et al. discloses a method for determining properties of a reservoir formation connected between two wells by analyzing the seismic signal transmitted into the formation from within one wellbore and received in another wellbore, the seismic signals including selected discrete frequencies comprising spectrally analyzing the received signals determining the presence of the Drag-Wave by determining the presence of the frequency side lobes of the Primary seismic wave (col. 7, lines 49-60).

As to claims 2-3, Chon et al. discloses a method for determining properties of a reservoir formation connected between two wells by analyzing the seismic signal transmitted into the formation from within one wellbore and received in another wellbore, the seismic signals including selected discrete frequencies comprising determining the frequency of the side lobes in

the frequency spectrum of the received signals and using the determined side lobes frequencies to calculate the Drag-wave frequency (col. 8, lines 22-37).

Referring to claims 4-5, Chon et al. discloses a method for determining properties of a reservoir formation connected between two wells by analyzing the seismic signal transmitted into the formation from within one wellbore and received in another wellbore, the seismic signals including selected discrete frequencies comprising using the value of the Primary wave input frequency and the calculated Drag-Wave frequency along with the calculated Compressional Wave velocity of the rock formation between the two wells, the Drag-Wave velocity in the formation between the two wells can be calculated (col. 6, lines 19-31).

As to claim 8, Chon et al. discloses a method for determining properties of a reservoir formation connected between two wells by analyzing the seismic signal transmitted into the formation from within one wellbore and received in another wellbore, the seismic signals including selected discrete frequencies comprising determining the relative amplitude of the Primary input frequency side lobes in relation to the amplitude of the Primary frequency as received and recorded in the receiver well using this relative amplitude value as a qualitative measure of the in-situ rock properties of the reservoir formation between one well pair to the next well pair in a field (col. 2, lines 37-45).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

- (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chon et al. in view of Stearns.

Referring to claim 6, Chon et al. does not disclose a method for determining the bulk tortuosity of the in-situ reservoir formation between the two source and receiver wells based on the calculated Drag-Wave velocity and the compressional velocity of the pore fluids derived from the well logs and the fluid samples from the wells.

Stearns discloses a method for determining the bulk tortuosity based on the calculated Drag-Wave velocity and the compressional velocity (col. 2, lines 59-63; col. 3, lines 61-65; col. 4, lines 7-18; equation # 3).

Accordingly, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have applied the method for determining the bulk tortuosity as described in the Stearns reference into the method of Chon et al. to have a better accurate mapping permeable reservoir formations.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chon et al. in view of Liu et al..

Referring to claim 7, Chon et al. does not disclose a method for estimating the bulk permeability of the in-situ reservoir rock formation connected between the two wells based on the calculated value of the tortuosity and the value of porosity and average pore radius derived from the well logs and the core samples of the reservoir rock.

Liu et al. discloses a method for estimating the bulk permeability of the in-situ reservoir rock formation connected between the two wells based on the calculated value of the tortuosity

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and the value of porosity and average pore radius derived from the well logs and the core samples of the reservoir rock (col. 15, lines 37-60).

Accordingly, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have applied the method for estimating the bulk permeability of the in-situ reservoir rock formation as described in the Liu et al. reference into the method of Chon et al. to have a better accurate mapping permeable reservoir formations.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Toan M Le whose telephone number is (703)305-4016. The examiner can normally be reached on Monday through Friday from 7:30 A.M. to 4:30 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Lefkowitz can be reached on (703)305-4816. The fax phone numbers for the organization where this application or proceeding is assigned are (703)872-9318 for regular communications and (703)872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)305-0956.

Toan Le

July 29, 2002



EDWARD LEFKOWITZ
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800